



ACE'S

ACTIVITY

BOOK

Fun and Facts
Relating to
the ACE Basin
Reserve



DNR



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The Purpose of This Book

This activity book is a fun way to reinforce and enrich every student's ACE Basin experience ... to instill a stronger awareness and respect for environmentalism and conservation, to broaden their knowledge of this area where they co-exist with a diversity of other life forms, and to encourage them to enjoy the adventure and discovery within Coastal South Carolina.

Materials Needed

Most activities require a pencil or pen. Other activities list ingredients or materials needed.

These pages can also be used as coloring pages. Enjoy ... in the classroom, or at home with your family.

What Is the ACE Basin?

The ACE Basin is a coastal region of South Carolina. It is one of the largest estuaries on the East Coast of the United States. Inland areas are forests, with extensive marshes spreading toward the ocean. It is home to abundant plant and animal life, including many endangered species. This region also has a rich history of culture and tradition.

To discover the three rivers from which the ACE Basin was named, follow the path through the maze. Put each letter, in order, on the blanks below.

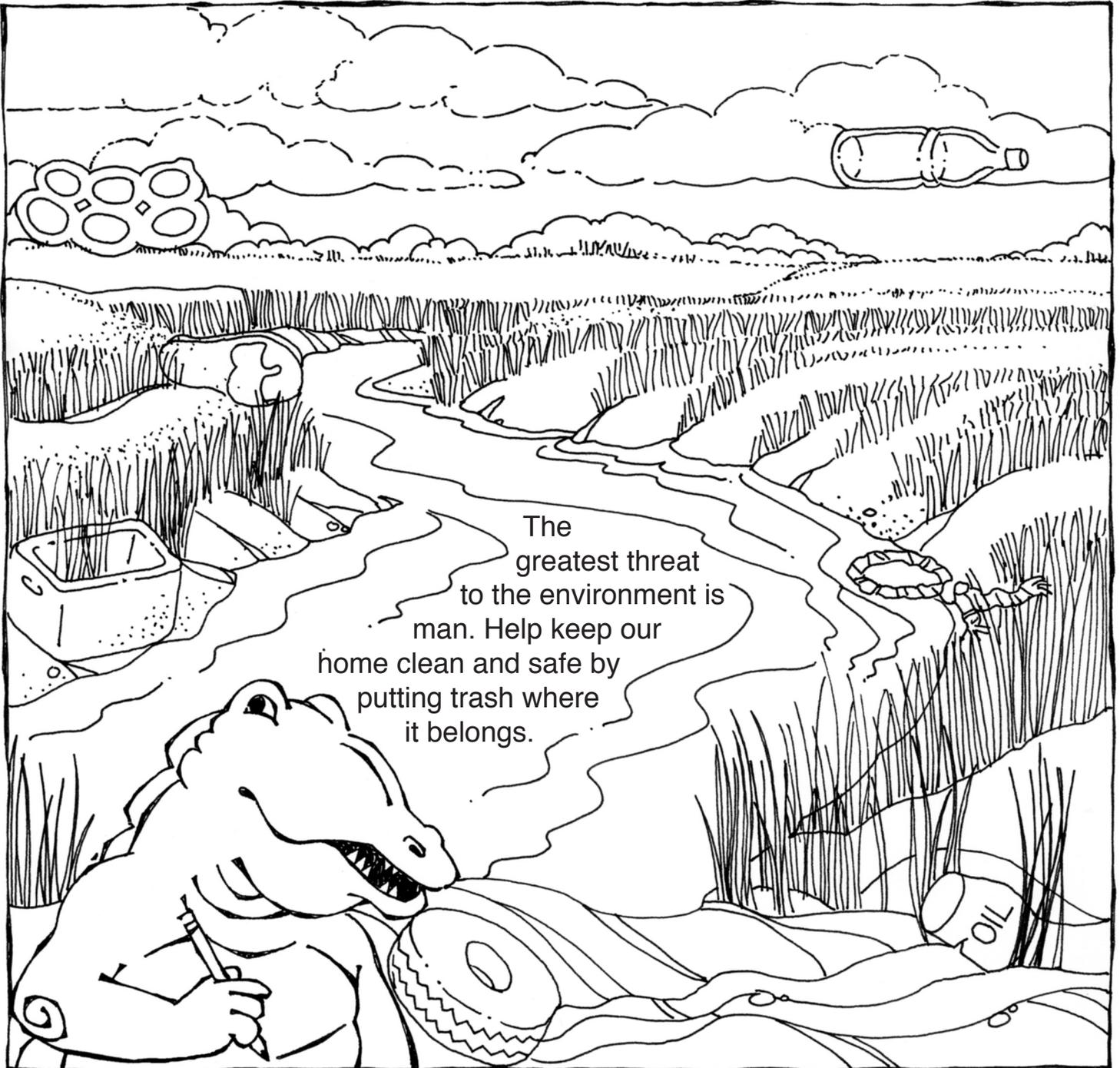
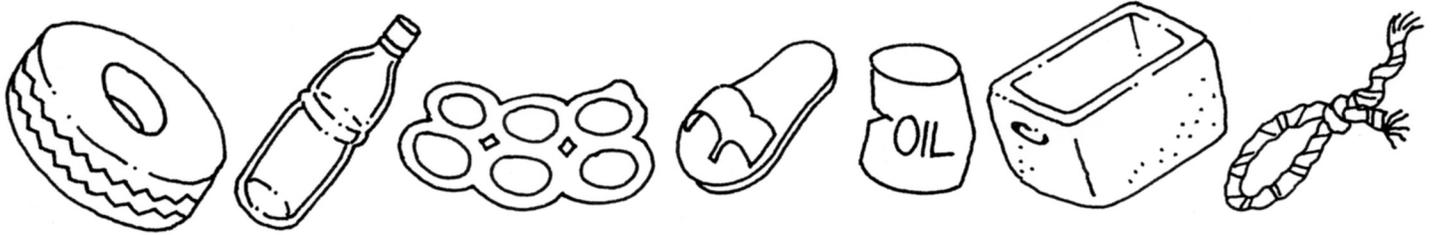
The way to say it:
Ashepoo ... ASHY-poo
Combahee ... CUM-bee
Edisto ... ED-i-stow



The _____, the _____,
and the _____ Rivers.

What Doesn't Belong?

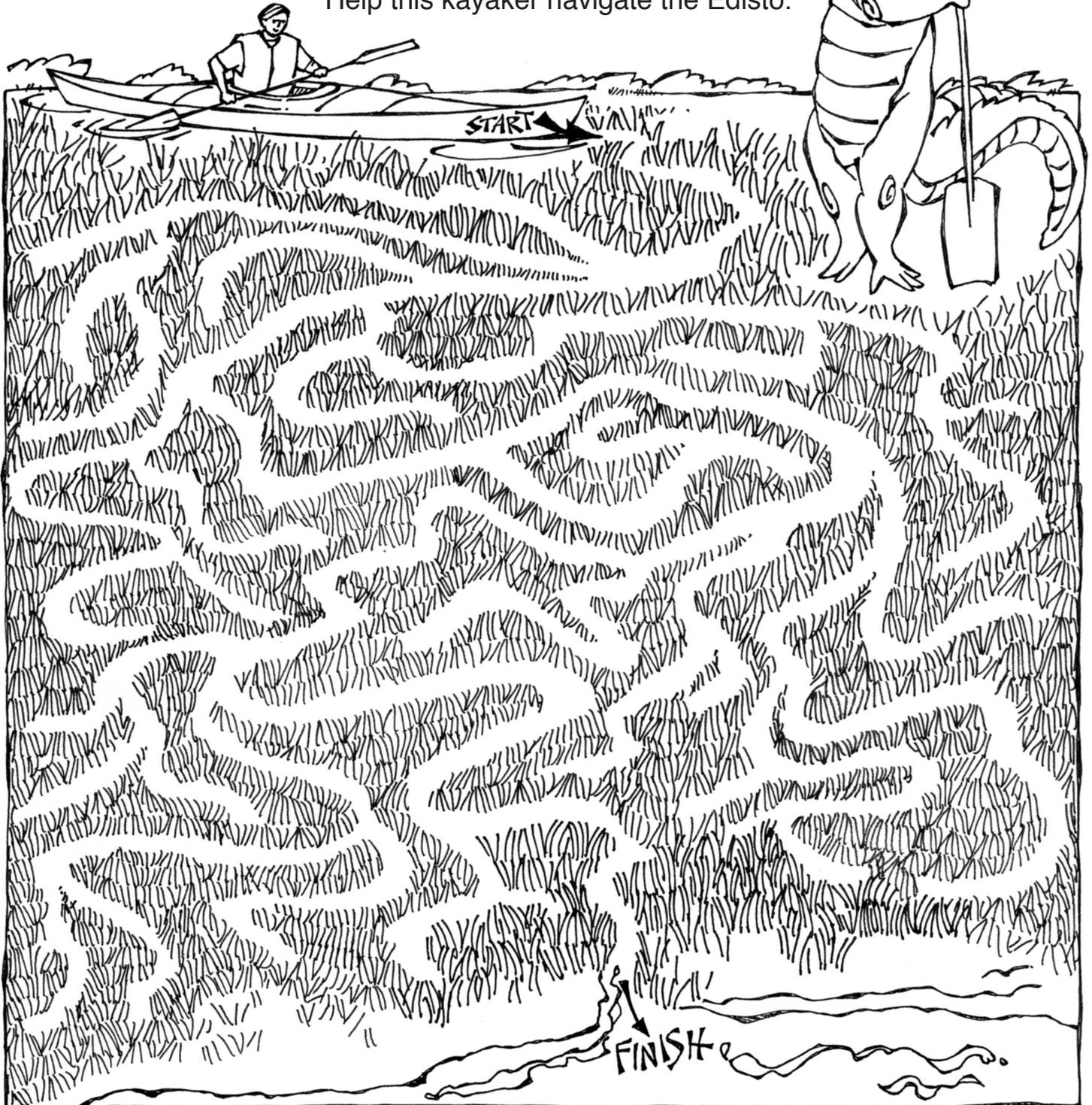
Circle these objects which do not belong in the marsh .



Navigate the Edisto

The Edisto River is the largest of the three rivers that form the ACE Basin, and is the longest blackwater river in North America. It flows more than 300 miles from its headwaters near Aiken, South Carolina down to St. Helena Sound and the Atlantic Ocean.

Help this kayaker navigate the Edisto.



Home for People

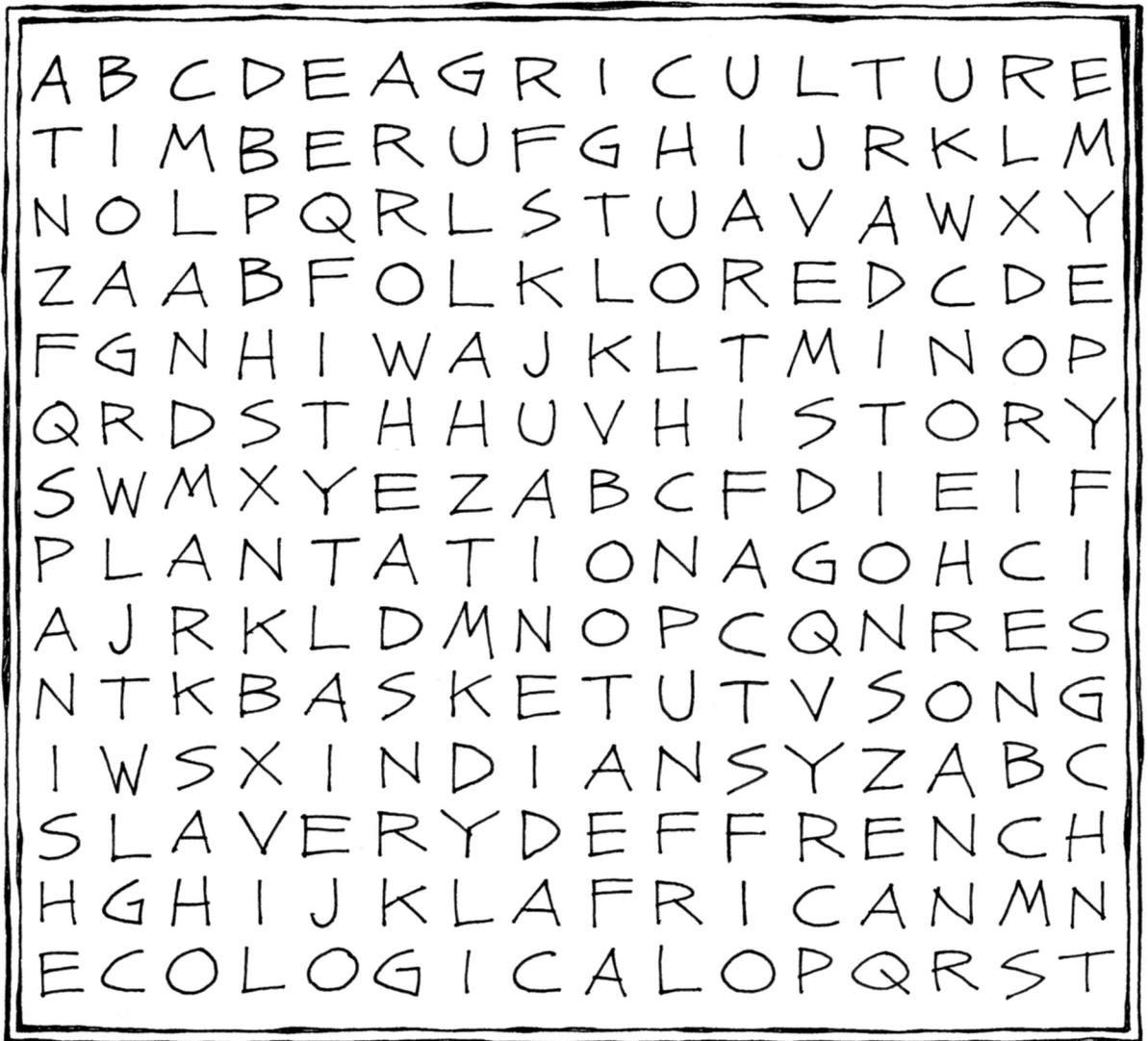
In addition to the ecological value of the ACE Basin, the region is also rich in history. Historic landmarks such as old plantation homes, forts, cemeteries and churches are preserved. Cultural traditions are passed from generation to generation.

The ACE Basin has been inhabited by humans since the Native Americans settled here, about 6,000 years ago. As a matter of fact ... Edisto, Combahee, and Ashepoo are names of Native American tribes that lived in the area. Artifacts, such as arrowheads, and evidence of their subsistence can still be found today. The French and Spanish established settlements in the 16th century. However, the Indians continued to dominate the area, until they were displaced by later European settlements. Large scale agriculture and timber production began. Slavery was introduced to manage the cultivation of rice.

A unique culture ... Gullah ... developed. Through the Gullah, African traditions continue today through culinary practices, folklore, song, and language. The artistry of basket making is one of the most visible ongoing practices of the Gullah.

Circle the words, from this list, in the word search.

- African
- agriculture
- arrowheads
- artifacts
- basket
- ecological
- folklore
- French
- Gullah
- history
- Indians
- landmarks
- plantation
- rice
- slavery
- song
- Spanish
- timber
- traditions



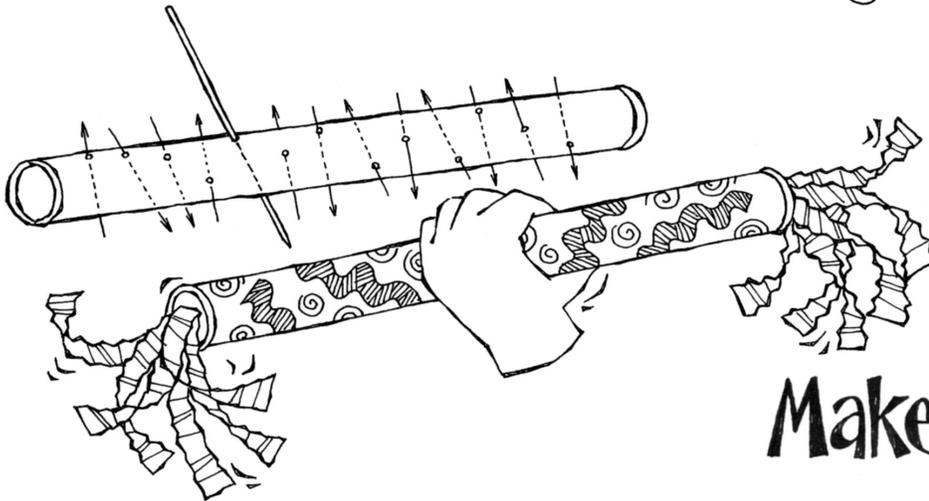
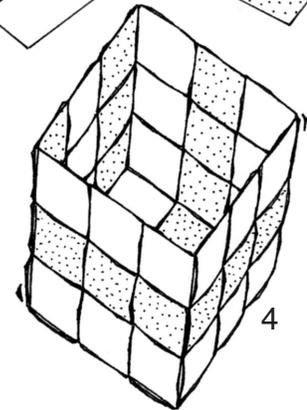
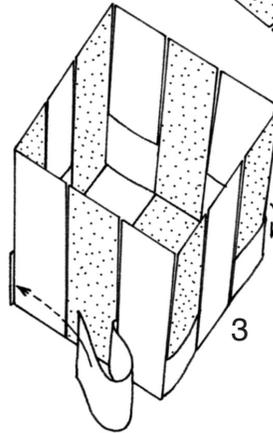
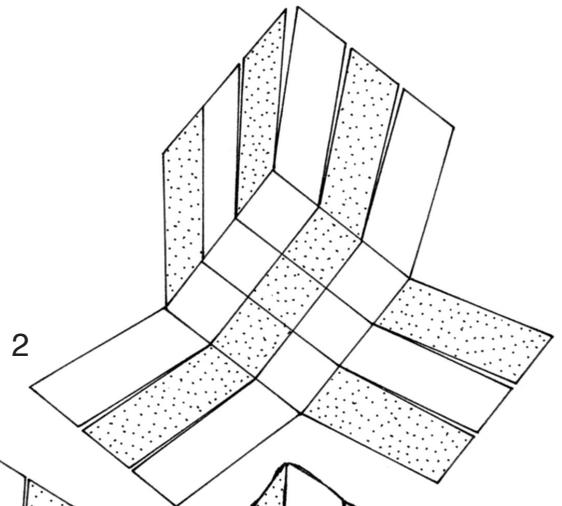
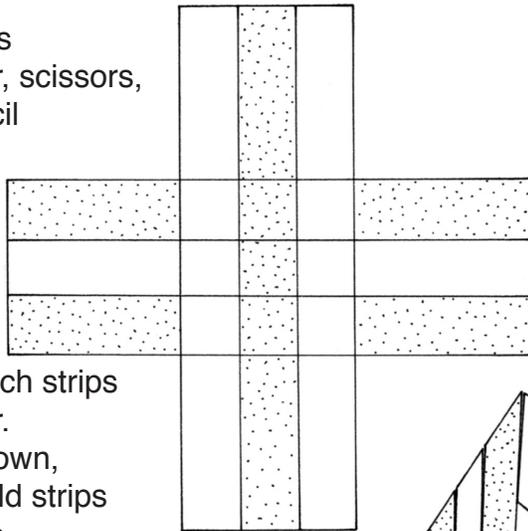
Make a Basket

Materials: Large sheets of construction paper, scissors, glue stick, ruler, pencil

Instructions

(per basket):

1. Cut 6 9-inch by 1-inch strips of construction paper. Cut 3 13-inch by 1-inch strips of construction paper.
2. Weave basket as shown, with 9-inch strips. Fold strips straight up from base.
3. Glue one 13-inch strip to bottom of vertical strip, weave horizontally through the vertical strips until the ends of that strip meet, glue to secure. Repeat weave up the sides of the basket with the other two 13-inch strips in the same manner.
4. Secure all loose ends at top of basket with glue.



Make a Rain Stick

Materials: Cardboard mail tubes with plastic caps, glue, nail, wooden skewers, sandpaper, rice (Optional: materials for decorating rain stick)

Instructions (per rain stick): **Ask an adult for assistance.**

1. Punch holes at angles through the length of cardboard tube with a nail, about 1 - 3 inches apart.
2. For each set of holes: Push skewer through the tube to stick out on the other side, trim ends, glue. After the glue dries, sand skewer tips smooth to side of tube.
3. Glue one cap to end of the rain stick. Allow to dry.
4. Remove other cap, pour in 1 cup of rice. Glue cap to this end, allow to dry.
5. Decorate as you wish.
6. Hold the rain stick ... shake, or tilt gently from side to side. Listen to the rain.

What is an estuary?

Solve this puzzle, using the code, to reveal the definition of an estuary.

●	○	◐	◑	□	■	▣	▤	▥	▲	▼	▴	▾
A	B	C	D	E	F	G	H	I	J	K	L	M
◒	◓	⊗	⊘	■	▣	▤	▥	▦	△	▽	▴	▾
N	O	P	Q	R	S	T	U	V	W	X	Y	Z

● ◒ □ ▣ ▤ ▥ ● ■ ▲ ⊗ ▣ ● ◐ ◑ ● ▣ ▤ ● ▲
 ● ■ □ ● △ ▣ □ ■ □ ▣ ● ▲ ▤ △ ● ▤ □ ■
 □ ■ ◒ ▼ ▤ ▣ □ ▣ □ ● ▼ ⊗ ▼ □ ▣ △ ⊗ ▤ ▣
 □ ■ □ ▣ ▤ △ ● ▤ □ ■ ▣ □ ◒ ▼ ▤ ⊗ ⊗ □ ■ ▣
 ▤ ▣ □ ▲ ● ■ □ ● ▼ ◒ ◑ ▤ ▤ ▣ □ ▼ ◒ ▣ ▤
 ⊗ ■ ◒ ◑ ▣ ◐ ▤ ⊗ ⊗ □ □ ◐ ◑ ▣ ▲ ▣ ▤ □ ▼ ▣
 ◒ ◑ □ ● ▤ ▣ ▤

Why are estuaries important?

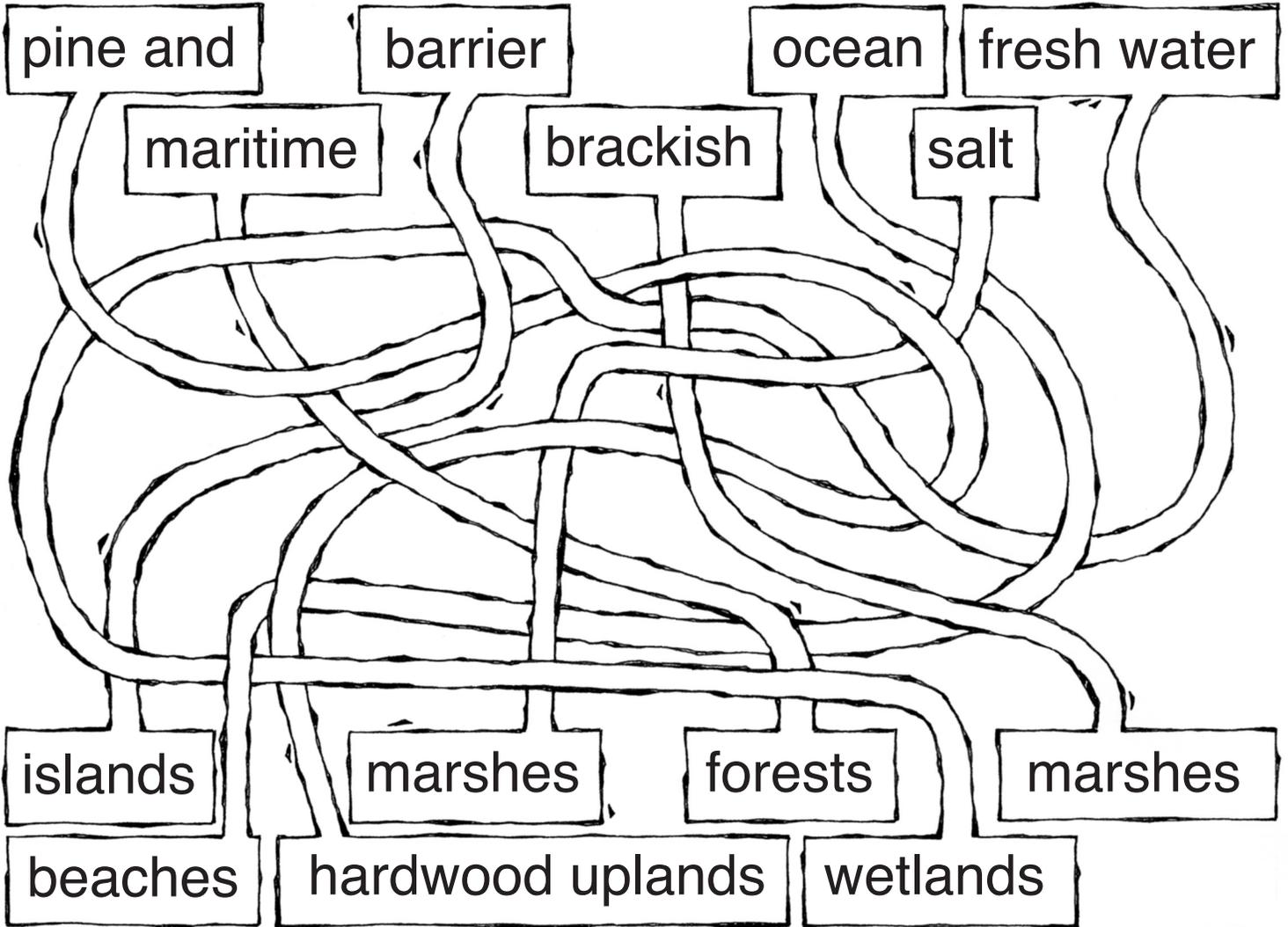


- Estuaries are essential habitats for wildlife.
- Two-thirds of the fish and shellfish caught in the United States depend on estuaries for their survival.
- Wetlands on the shores of estuaries protect human communities from flooding by acting like a giant sponge during storm events.
- Estuaries provide important recreational opportunities ... such as swimming, boating, fishing, birding, hiking, and hunting.
- Estuaries are important nursery grounds for many larval and juvenile marine species.
- Estuaries provide important resting and feeding grounds for many migrating birds.

Habitats in the ACE Basin

Diverse habitat allows a variety of plants and animals to thrive in the ACE Basin year-round.

Follow the trails to discover the different types of habitats found within the ACE Basin. List them on the blanks below.



Detritus

Detritus is an organic stew of nourishment and energy that feeds all living organisms in the estuary. Its a term that means “disintegrated matter” ... a slurry of decomposed marsh grass and animal matter in a solution of algae and bacteria. Tides carry detritus to all areas of the estuarine marsh.

Complete this puzzle, using words from the above definition of detritus.

For example:

ma**R**sh grass



D
E
T
R
I
T
U
S

What's That Smell?

Salt marsh smells are a natural occurrence in coastal areas, and provide a clue to understanding its ecology. As decomposition occurs in the marsh mud, it releases a "stink", especially on muggy days or when the mud is disturbed.

This smell comes from a mix of ingredients:

Saltwater ... Prevailing winds spread the odor of a mineral mix of table salt, magnesium, epsom, calcium, potassium, and lime.

Chlorophyll ... Marsh grasses release a green leafy smell, especially after a good rain.

Decay ... Marsh muds are full of ammonia compounds from decomposing plants and animals, releasing gaseous nitrogen into the air.

Sulfur ... When marsh mud is dug or disturbed, hydrogen sulfide (smells like rotten eggs) is released.

Label the causes of marsh smell, using the four terms above.



Pluff Mud Pudding

Ingredients: 1 box of chocolate pudding mix, milk, oreo cookies (2 per serving), thin pretzel sticks

Instructions:

1. Crush oreo cookies into chunks.
2. Make pudding, according to package directions.
Stir in oreo cookie chunks (to represent organic material).
Pour into individual serving containers.
3. Place a few pretzel sticks into top of pudding (to represent salt marsh grasses).
4. Allow pudding to set before serving.



The Food Chain

Use the code to find the definition of a food chain.

Code: T =  H =  E =  X = 
 C =  A =  N =  G =  O =  F =  D = 
 R =  Y =  B =  W =  I =  S =  M = 



The three basic types of organisms in the ACE Basin food chain are **producers**, **consumers**, and **decomposers**. Here is a list with examples of each organism:

PRODUCERS
 phytoplankton
 algae

CONSUMERS
 zooplankton
 crabs
 shellfish
 fish
 birds
 mammals
 reptiles
 amphibians

DECOMPOSERS
 bacteria
 fungi

Fill in the blanks on the diagram, using the lists on page 12 for help.



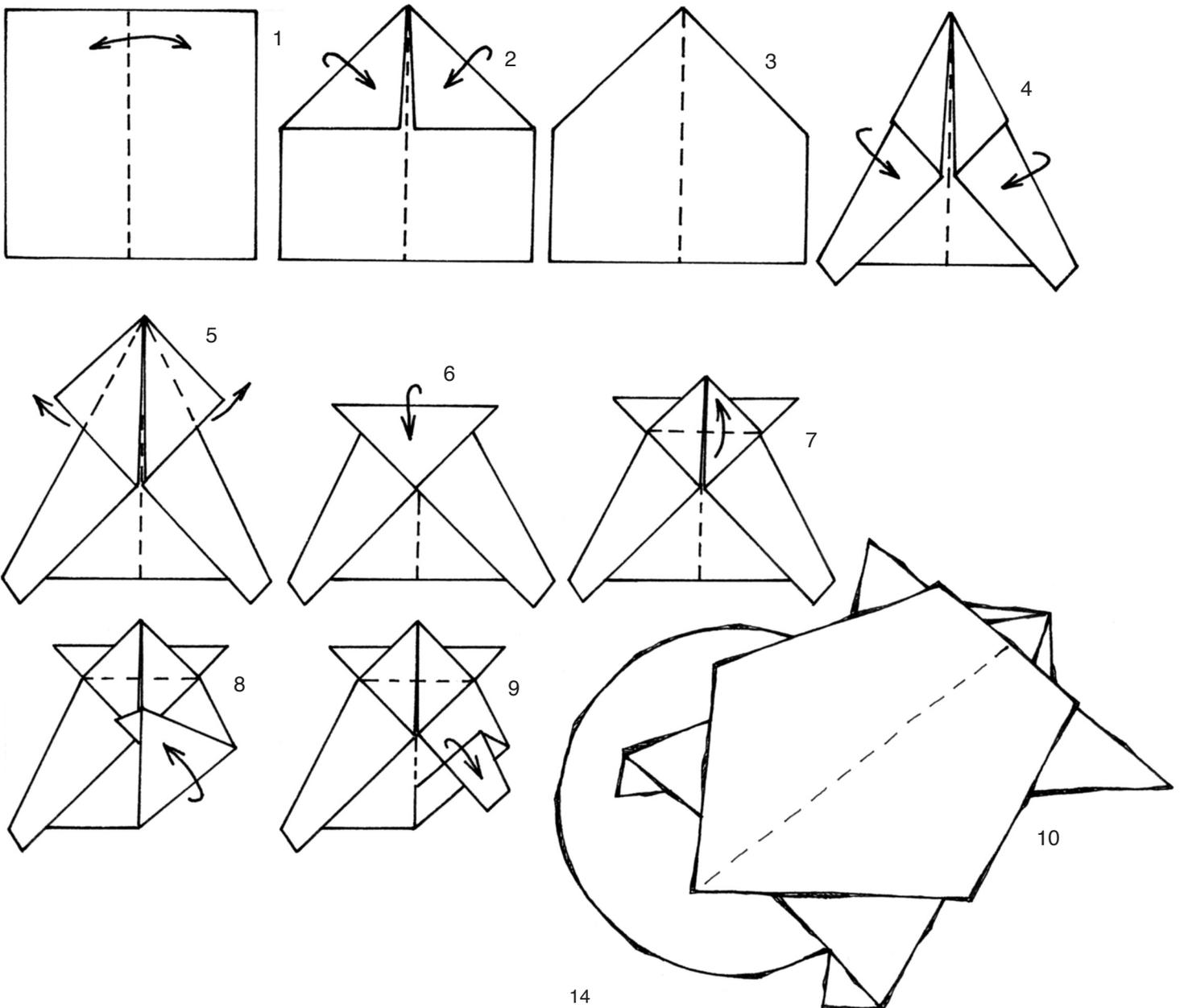
Your Own Turtle

Make a loggerhead sea turtle.

Make sharp creases on each fold.



1. Use a square piece of paper. Fold in half, side-to-side. Open.
2. Turn the paper over. Fold the right and left points to the center fold line.
3. Turn over.
4. Fold the outer corners to the center fold line.
5. Unfold the top side points to the outer edge.
6. Fold the top point down.
7. Fold the point up (this will be the turtle's head).
8. Fold the bottom edge to meet the center fold line.
9. Fold edge down.
Repeat Steps 8 and 9, for the other foot.
10. Turn over, decorate your turtle's shell.



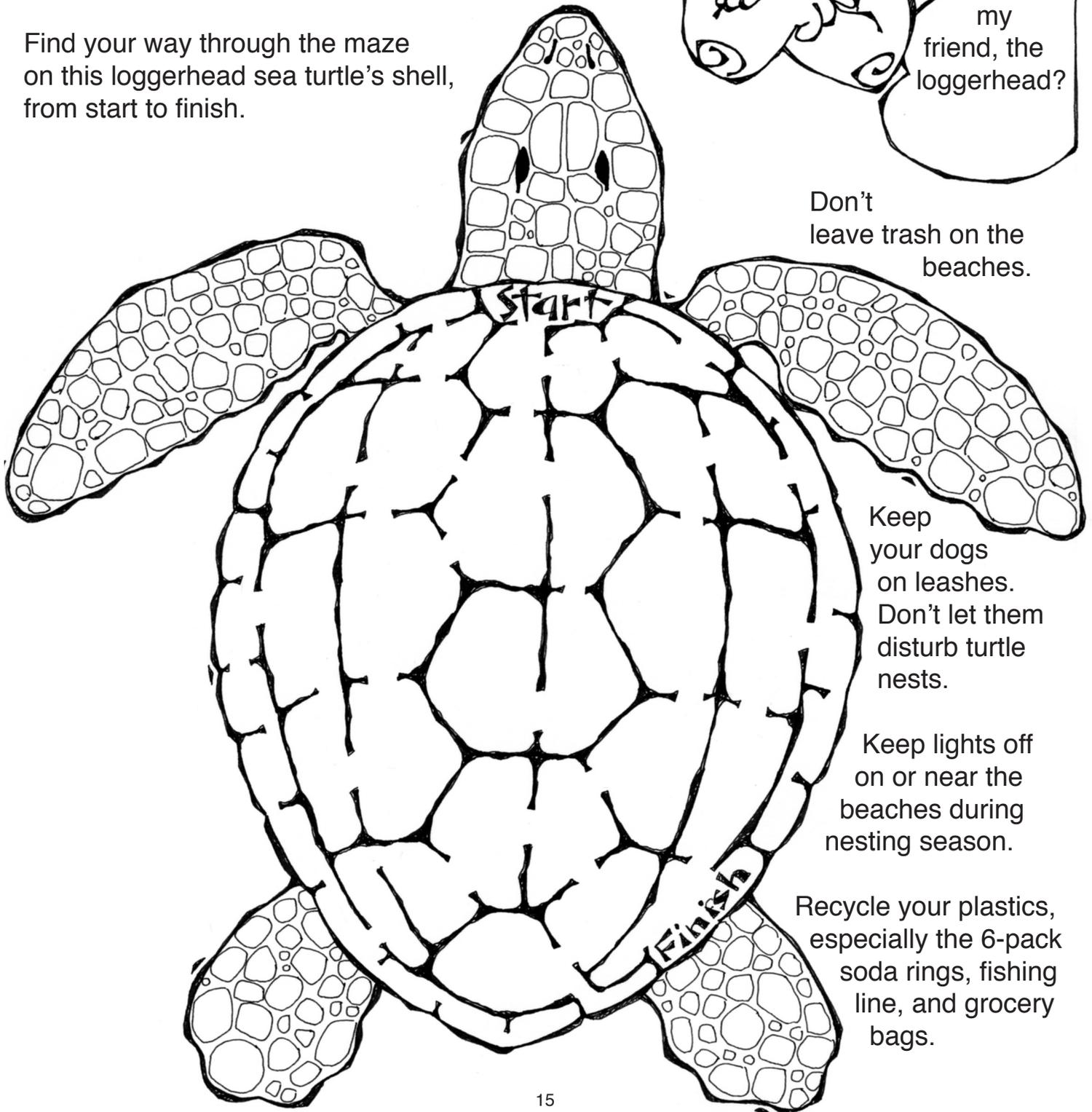
Home Sweet Home

Sea turtles eat a variety of organisms, including algae, seagrasses, sponges, crustaceans, jellyfish, and mollusks. With plentiful food, reduced threats to their survival, and conservation efforts the sea turtle calls the ACE Basin home.

Find your way through the maze on this loggerhead sea turtle's shell, from start to finish.



How can you help my friend, the loggerhead?



Don't leave trash on the beaches.

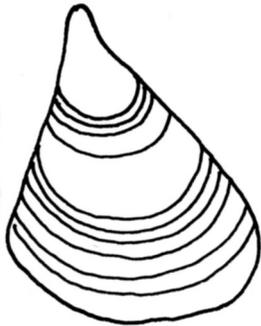
Keep your dogs on leashes. Don't let them disturb turtle nests.

Keep lights off on or near the beaches during nesting season.

Recycle your plastics, especially the 6-pack soda rings, fishing line, and grocery bags.

Hidden Pictures

Find these shells in the collage of dolphins below:



Pen Shell



Lettered
Olive ...

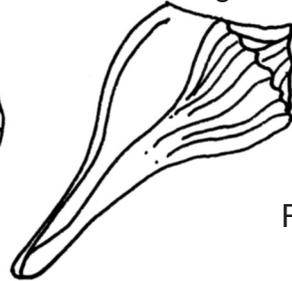
**South Carolina's
state shell**



Eastern
Mud Snail



Banded Tulip



Lightening Welk



Periwinkle



You Are Here

Label the areas of the ACE Basin on the map, using this list:

- Ashepoo River
- Atlantic Ocean
- Combahee River
- Edisto River
- St. Helena Sound



Snakes in the ACE

Snakes play important ecological roles in the fragile ecosystems. They control the population of harmful rodents and pests, thus helping people. Though sometimes dangerous, snakes can be useful ... and, as with any species, they have the right to exist.

Did you know?

There are 36 species (different kinds) of snakes in the ACE Basin. Six of these species are venomous.



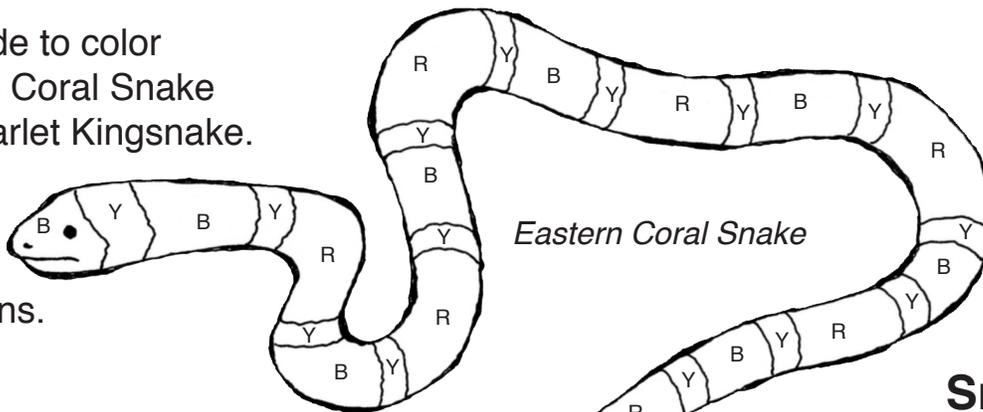
Coral Snake or Kingsnake?

The **Eastern Coral Snake** is one of the poisonous snakes that is found in the ACE Basin. Its mouth and fangs are small, but their poison is deadly and can cause many problems for humans if they are bitten. The Eastern Coral Snake is not very aggressive. In fact, it is a very shy snake and the majority of the bite cases are ones in which humans are trying to handle the snake. The head of the coral snake is black and the body is encircled by black rings with yellow margins that alternate with red bands.

The **Scarlet Kingsnake** is a non-poisonous snake that is found in the ACE Basin. This snake tries to trick people and other animals by having colors that are similar to the coral snake. However, you can tell the difference. Scarlet Kingsnakes are different in that they have red snouts and the yellow and red bands are separated by black.

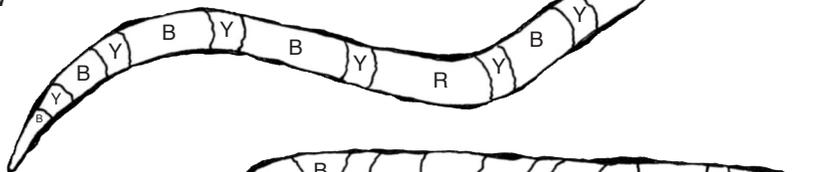
The saying, "**red on yellow, kill a fellow; red on black, friend of jack**" was coined to remember which species is venomous.

Use the code to color the Eastern Coral Snake and the Scarlet Kingsnake. Notice the differences in the color patterns.



Eastern Coral Snake

R = red
Y = yellow
B = black



Scarlet Kingsnake

Snake Snack

Ingredients - large marshmallows, pretzel sticks, red or black licorice

Push a pretzel stick into the flat end of a marshmallow, then push the flat end of another marshmallow onto the other end of the pretzel stick. Keep attaching alternating marshmallows and pretzel sticks, to the desired length of your snack (or make one giant snake for everyone to share). Push bits of licorice into the sides of the first marshmallow for eyes. To form the tongue, split a piece of licorice, and push the solid end into the flat side of the first marshmallow. Pinch the last marshmallow into a point for the tail.

Estuarine Habitats

Find these inhabitants of the estuarine habitat in the word search puzzle.

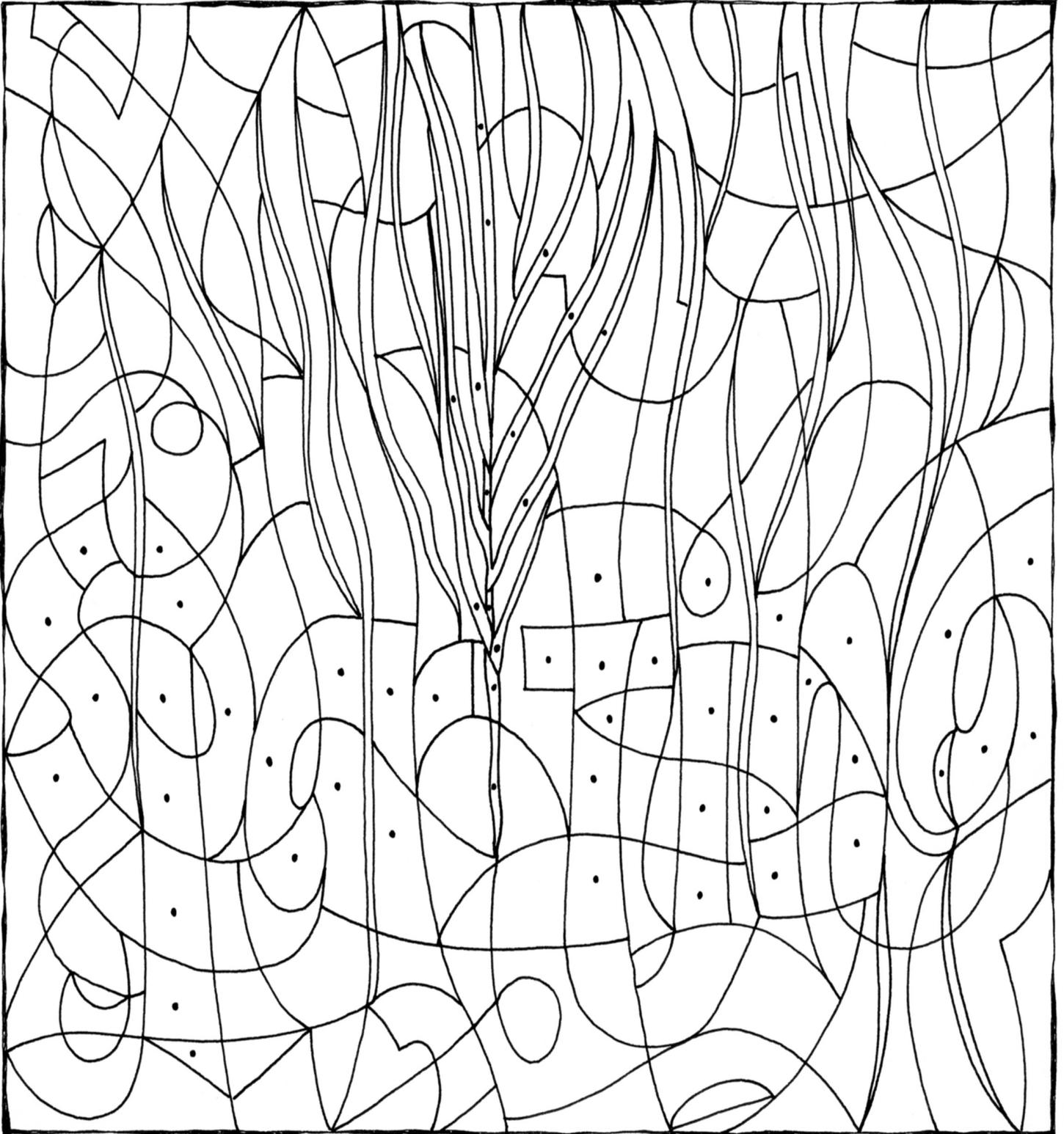
ALLIGATOR
BASS
BOBCAT
BLUE CRAB
CATFISH
CLAM
CORDGRASS
CRAB
DEER
DOLPHIN
DOVE
EAGLE
EGRET
FERN
FIDDLER CRAB
FLOUNDER
FOX
MOSQUITO
MULLET
OYSTER
PELICAN
PINE
POISON IVY
RABBIT
RACCOON
RATTLESNAKE
RED DRUM
SEA OATS
SHARK
SHRIMP
SPARTINA
SQUIRREL
STARFISH
TERRAPIN

X Y C A S B L U E C R A B S
D O L P H I N A T X O N A P
E K A N M O S Q U I T O S A
E L M O O L S H A R K M S R
R Y R K M M G R A B B I T T
M Z L R U T H A A C O A D I
F I D D L E R C R A B L P N
L D O Y L R I C K T C L E A
O C V Z E R F O X F A I L A
U O E A T A J O L I T G I B
N R Z B Y P K N Y S X A C C
D D S H R I M P N H K T A P
E G M P I N E K S O H O N O
R R E D D R U M T T T R E I
R A T T L E S N A K E L F S
Y S U E A G L E R Y Z K G O
I S R E G R E T F E R N H N
A Z K T A S Q U I R R E L I
K S E A O A T S S X A J I V
X O Y S T E R K H C R A B Y

Coastal Plants and Animals

This is the most abundant and ecologically important plant in the ACE Basin's salt marshes. It provides the bulk of detritus to the marsh community, providing a major link in the food web. Many animals call this plant home.

To find the name of this plant and what it looks like, color all the sections with a dot.



Try signing these animals of the ACE Basin.



Eagle



Lizard



Turtle



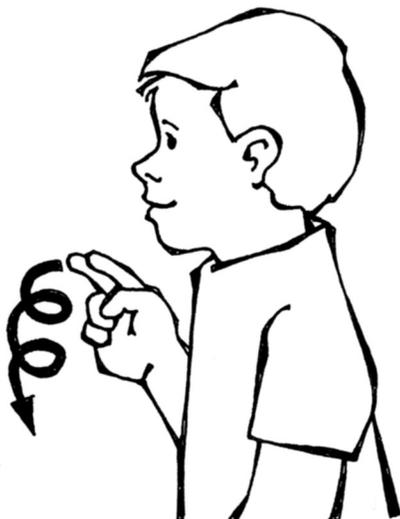
Shark



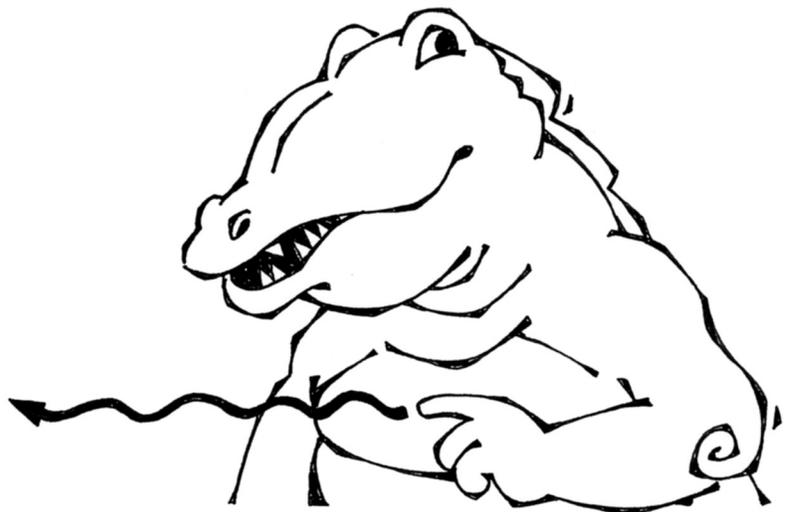
Fish



Raccoon



Snake



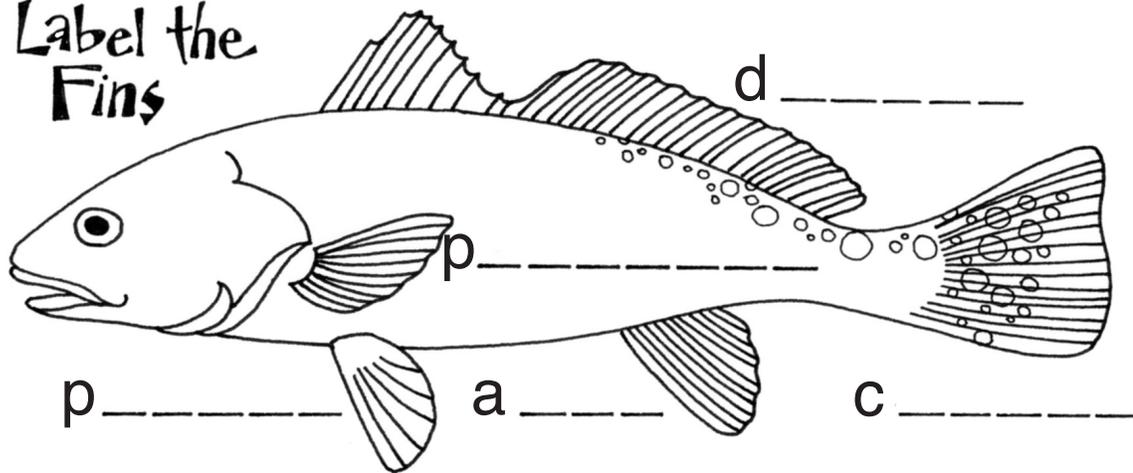
Dolphin

Red Drum

The ACE Basin is home to a wide diversity of fish habitats from the high salinity of St. Helena Sound to the freshwater rivers and streams that feed it.

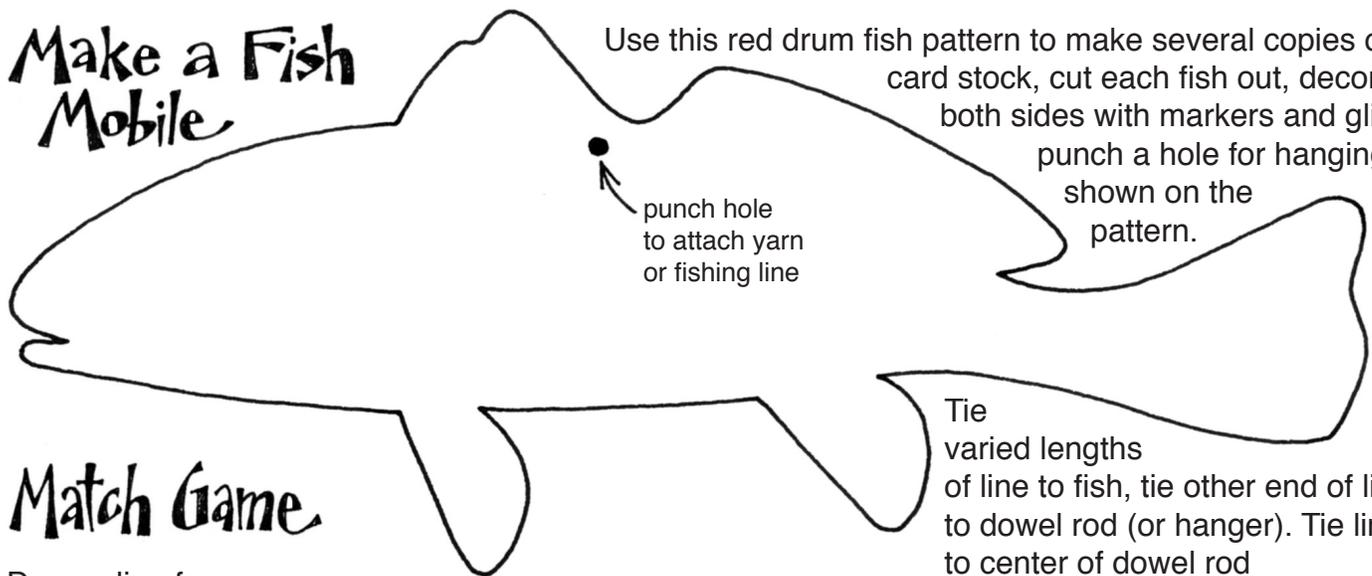
The red drum (spottail bass) is a saltwater fish that thrives in St. Helena Sound.

Label the Fins



anal
caudal
dorsal
pectoral
pelvic

Make a Fish Mobile



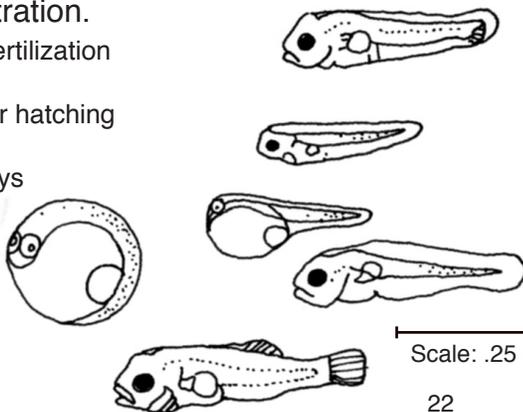
Use this red drum fish pattern to make several copies onto card stock, cut each fish out, decorate both sides with markers and glitter, punch a hole for hanging as shown on the pattern.

Tie varied lengths of line to fish, tie other end of line to dowel rod (or hanger). Tie line to center of dowel rod for hanging.

Match Game

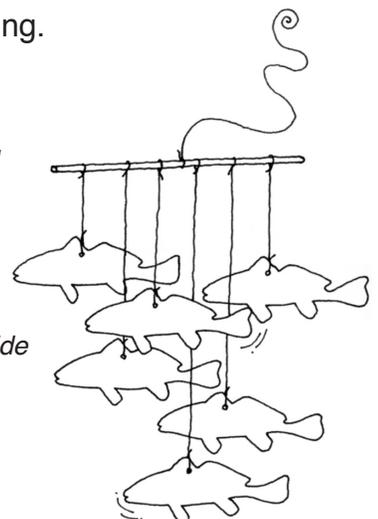
Draw a line from the description of the developmental stage of the larval red drum to its matching illustration.

1. Egg, 1 day after fertilization (.04 inch length)
2. Larva, 1 hour after hatching (.07 inch length)
3. Larva, at 1 1/2 days (.07 inch length)
4. Larva, at 4 days (.11 inch length)
5. Larva, at 8 days (.15 inch length)
6. Larva, at 13 days (.25 inch length)



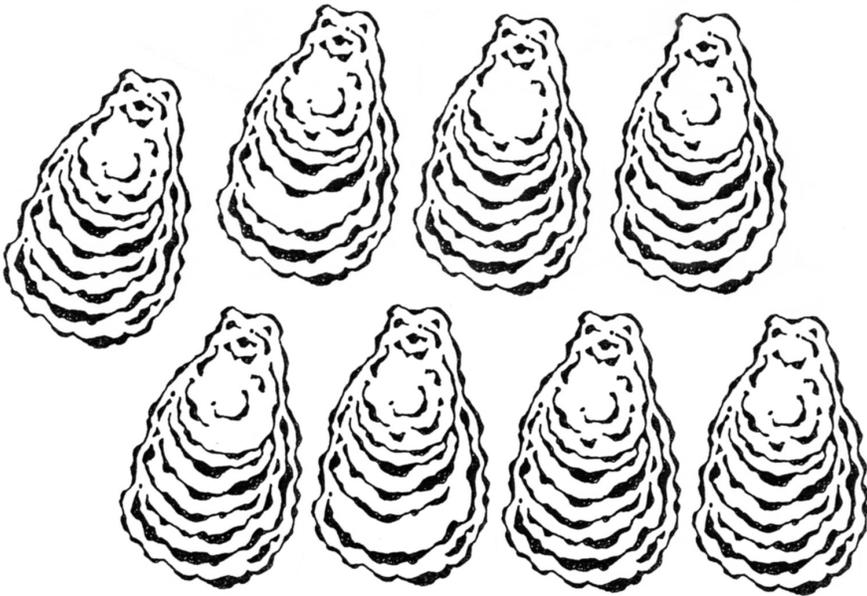
Scale: .25 inch length

Alternate:
Write something you have learned about the ACE Basin on each side of the fish.

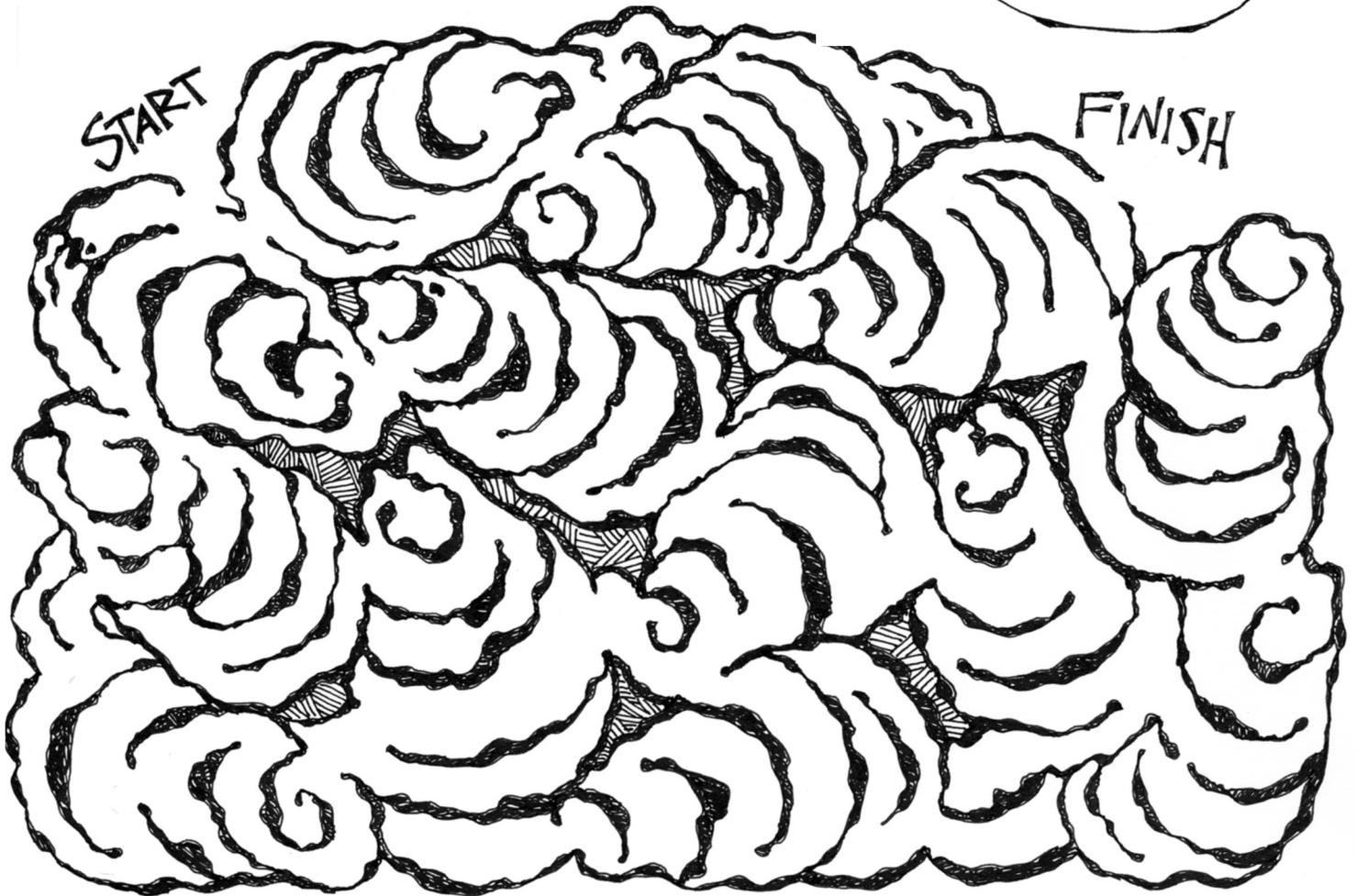


Oysters

Circle the two oysters that match.



Find your way through this oyster bed.



Why are oysters important?

Filters: An adult oyster filters up to 50 gallons of water per day, improving water quality in the process.

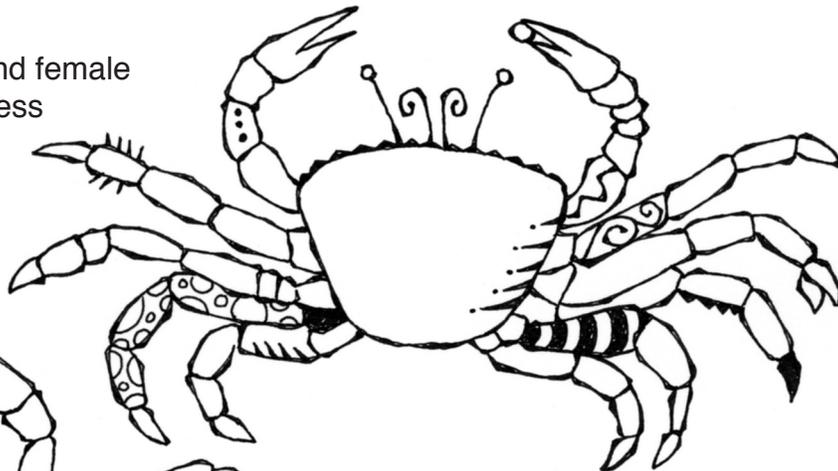
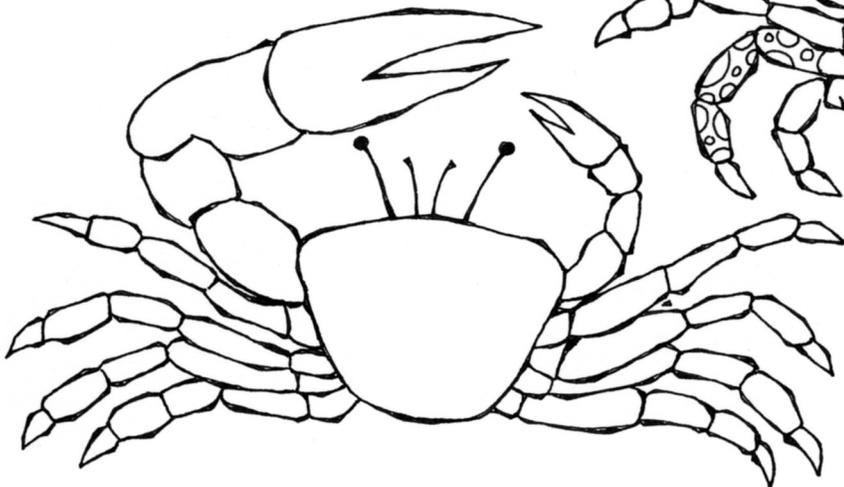
Habitat: Oysters build reefs which provide habitat for fish, shrimp, crabs, birds, and other animals.

Erosion control: Oyster reefs are natural breakwaters that can protect shorelines.



Fiddler Crab

It is easy to distinguish between a male and female fiddler crab. The females are smaller and less colorful. The male fiddler crab also has a large claw.



How many differences can you find in these two crabs?

Crack the code to find out why this crab is called "the fiddler".

A=1 B=2 C=3 D=4 E=5 F=6 G=7 H=8 I=9 J=10 K=11 L=12
M=13 N=14 O=15 P=16 R=17 S=18 T=19 U=20 V=21 W=22 X=23 Y=24

19 8 5 13 1 12 5 3 17 1 2 8 1 18 1
 8 20 7 5 3 12 1 22 19 8 1 19 8 5
 22 1 21 5 18 2 1 3 11 1 14 4 6 15 17 19 8
 1 18 9 6 20 18 9 14 7 1 2 15 22 19 15
 16 12 1 24 1 6 9 4 4 12 5

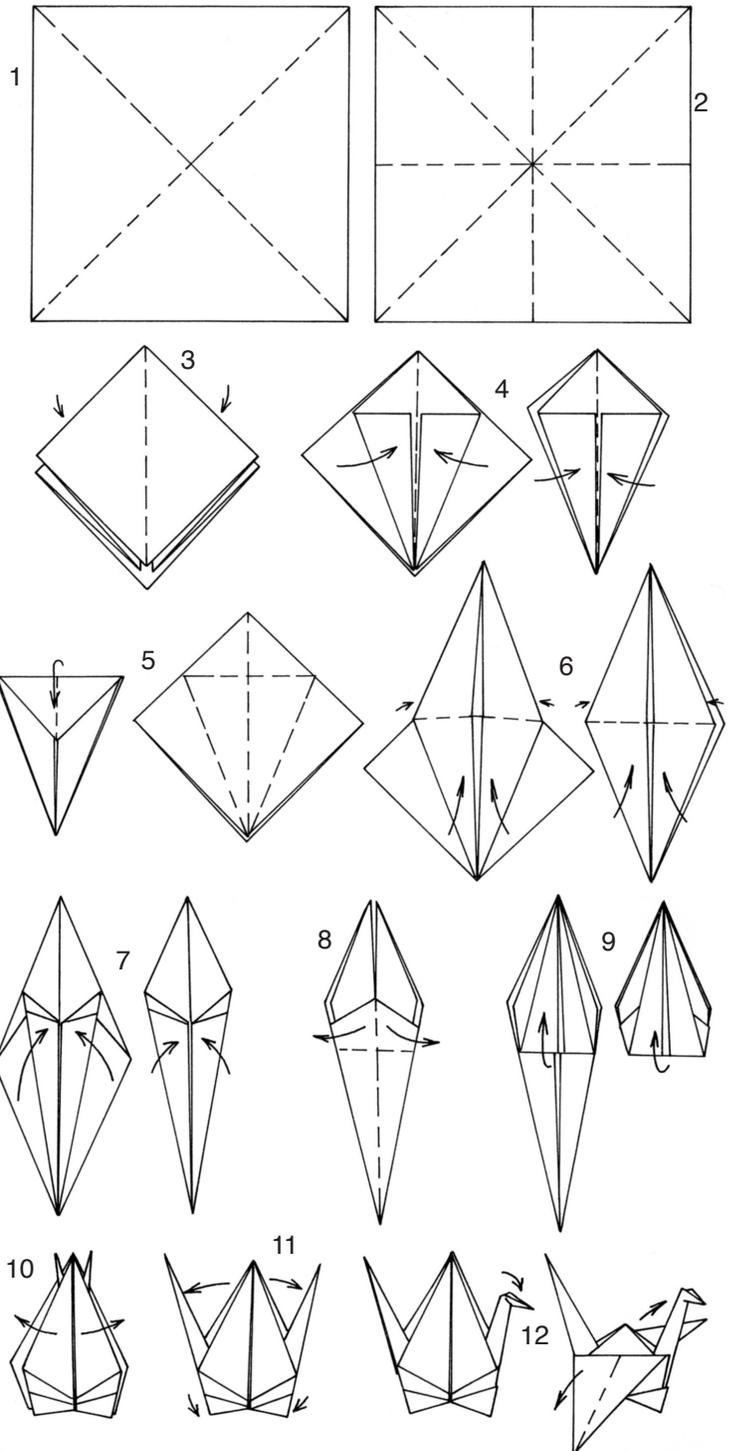
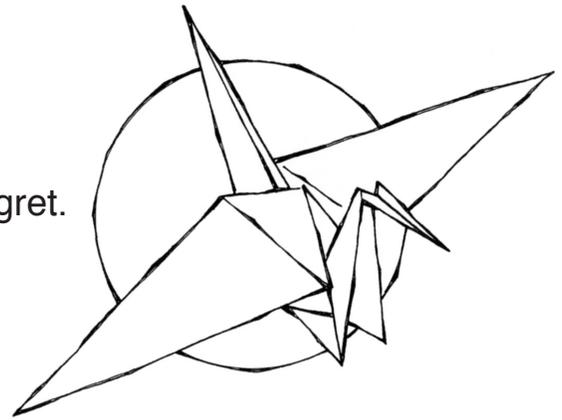
Egret

Follow the directions to make this graceful egret.

Use an 11-inch square sheet of thin white paper
(gift wrap works well).

Crease FIRMLY on all folds.

1. Fold paper away from you diagonally, both ways. Open.
2. Fold paper toward you in half, both ways. Open.
3. Bring all corners together, folding in sides.
4. On top layer, fold two side corners in to center (making a kite shape). Flip, repeat on other side.
5. Fold the top corner down toward you, crease along the top edge of the fold from Step 4. Open folds from Step 4 and 5.
6. Lift the bottom corner, using the horizontal crease (top layer only). Pull up to the top, using the creases made in Step 4. Flip, repeat on other side.
(The top flaps will be the wings, the bottom flaps will be the neck and tail.)
7. Fold in each side (like in Step 4), to make the neck and tail thinner. Flip, repeat on other side.
8. Fold the right flap at the center line, to lay over the left flap (like turning a book page). Flip, repeat on other side.
9. Fold up the bottom corner from the top layer, along crease, to meet corners at top. Flip, repeat on other side.
10. Repeat "page-turning" action, as in Step 8 (fold right flap at center line, over left flap). Flip, repeat on other side.
11. Pull out two points from between flaps (wings), to the angle shown. Press down along the base of the egret to make it sit in place.
12. The make the egret's head, bend one of the points down. Using your thumbnail, reverse the crease in the head, and pinch it to form a beak. Bend the wings down.



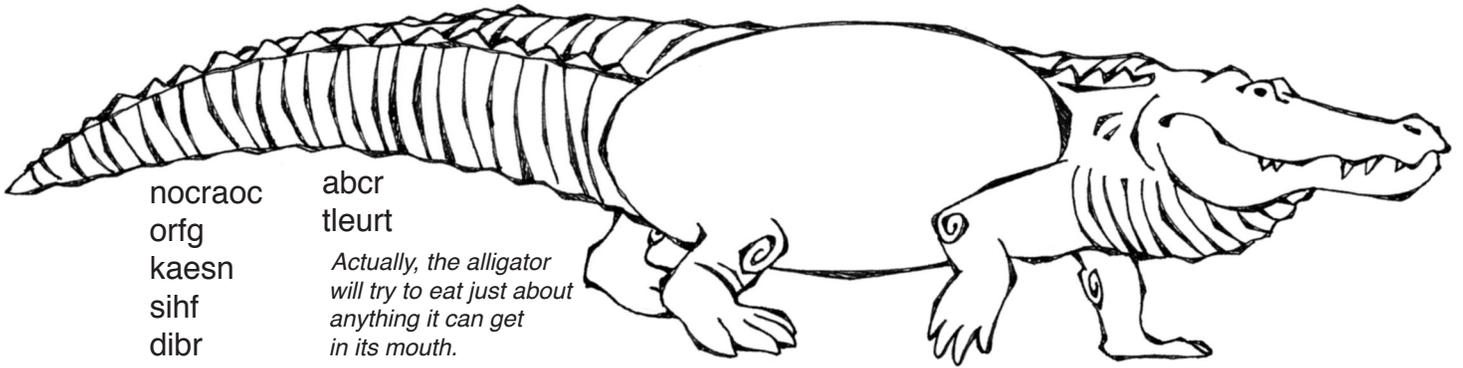
Alligators

Alligators in the ACE Basin can grow to be more than 13 feet in length, weighing 450-500 pounds. The male alligator is usually much larger than the female. The female can lay 25 - 70 eggs, which hatch in 2 - 3 months.

The hatchlings are about 8 inches in length at birth, completely independent, and quickly take to the water. Alligators grow about 12 inches a year, and reach maturity in about 6 years.

Even though they are large animals, alligators need just one pound of food a week. However, there's plenty to feast on in the ACE Basin.

Unscramble the words below and fill this gators stomach with food he might find in his habitat.



True or False

T	F
<input type="checkbox"/>	<input type="checkbox"/>

1. An alligator's tail is half of its length.
2. Alligators were once close to extinction.
3. Alligators can be found throughout the United States.
4. Alligators chew their food.
5. When charging, an angry alligator can outrun a man for 100 feet.

The name alligator comes from the Spanish word "el lagarto", which means "the lizard".



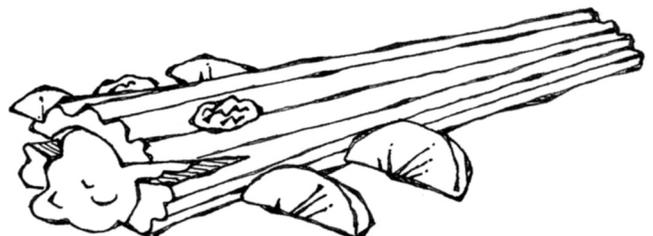
1. T - The tail is extremely powerful. It is used to propel the alligator through water, and is used to restrain prey. 2. T - Conservation efforts have saved the alligator from extinction. 3. F - An alligator's natural habitat is only in the coastal southeastern United States. 4. F - Alligators bite their prey, tear off chunks, and swallow them whole. 5. T - Always use caution in an alligator's known habitat.

Chomp on This Alligator Snack

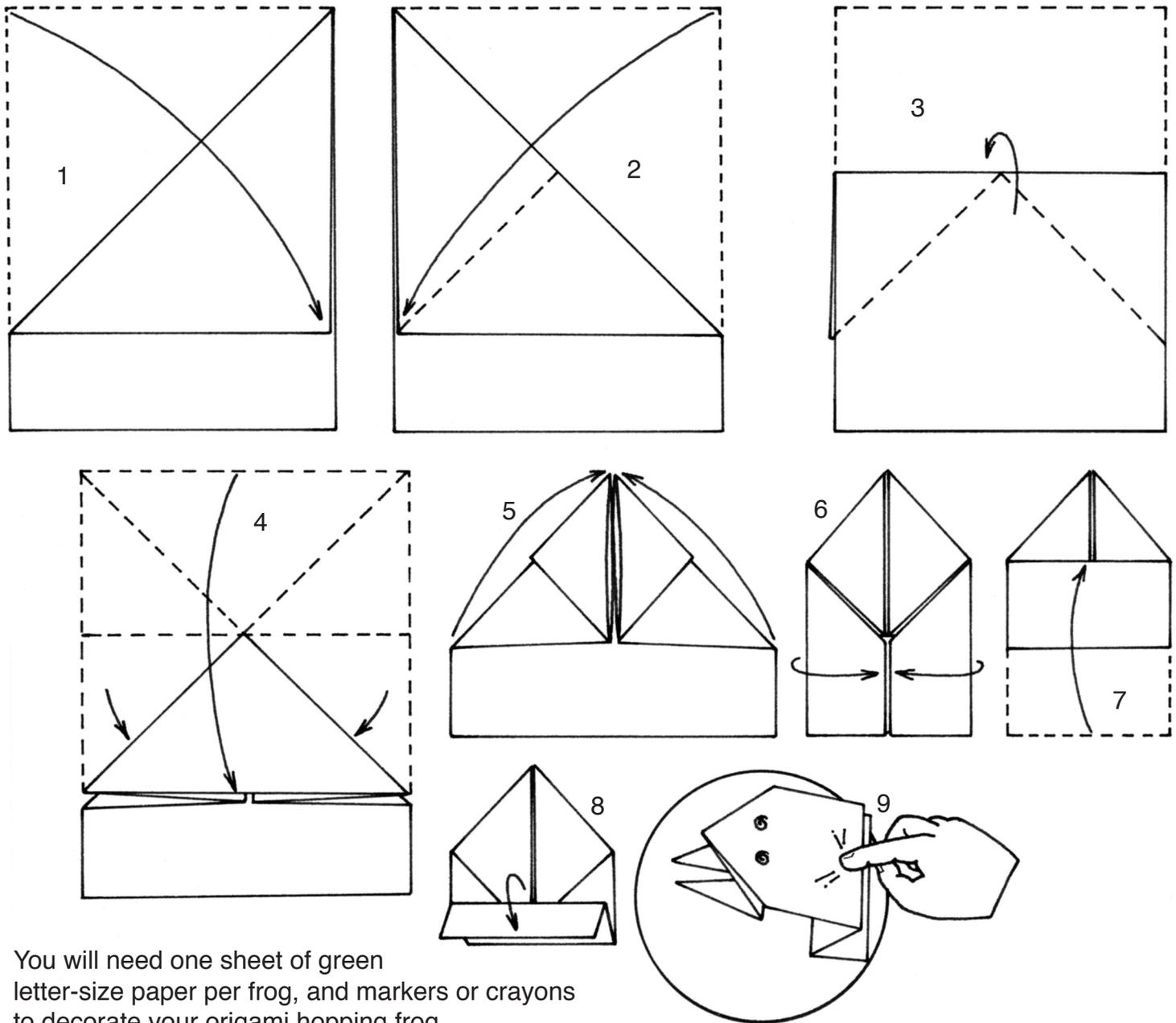
Ingredients for each alligator snack ... 1 celery stalk, 4 wedges orange or apple, peanut butter, raisins

INSTRUCTIONS

1. Trim ends of celery stalk.
Cut wedge into large end (for alligator's mouth).
2. Spread peanut butter in celery stalk. Turn over onto plate. Use peanut butter to place 2 raisin eyes, 4 orange wedges.
3. Enjoy!



Hopping Frog Origami



You will need one sheet of green letter-size paper per frog, and markers or crayons to decorate your origami hopping frog.

Instructions: *(Crease all folds firmly.)*

1. Fold left corner to right side. Open.
2. Fold right corner to left side. Open.
3. Fold to back, at intersection of diagonal folds. Open.
4. Fold flap forward. Push sides in at folds to form a "tent".
5. Fold bottom left corner to center top corner. Fold bottom right corner to center top corner.
6. Fold left side to center. Fold right side to center.
7. Fold bottom edge up to meet side corners.
8. Fold top edge of flap down to bottom edge.
9. Draw eyes and decorate frog. Push edge of frog's back to make him hop.

Nature's Playground

Unscramble these words to make a list of some things you can do in the ACE Basin.

inortug Itantonpsai _____

guithnn _____

incnoega nad gkkniaya _____

pgmainc _____

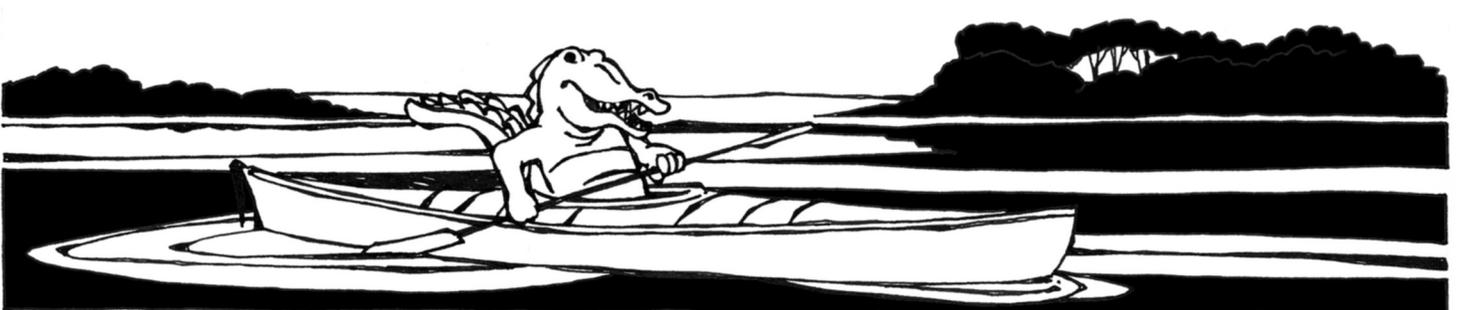
ygpoohrtahp _____

kginib _____

hgknii _____

ntogbia _____

gnicthawdirb _____



Answers: touring plantations, hunting, canoeing and kayaking, camping, photography, biking, hiking, boating, birdwatching

Come Prepared

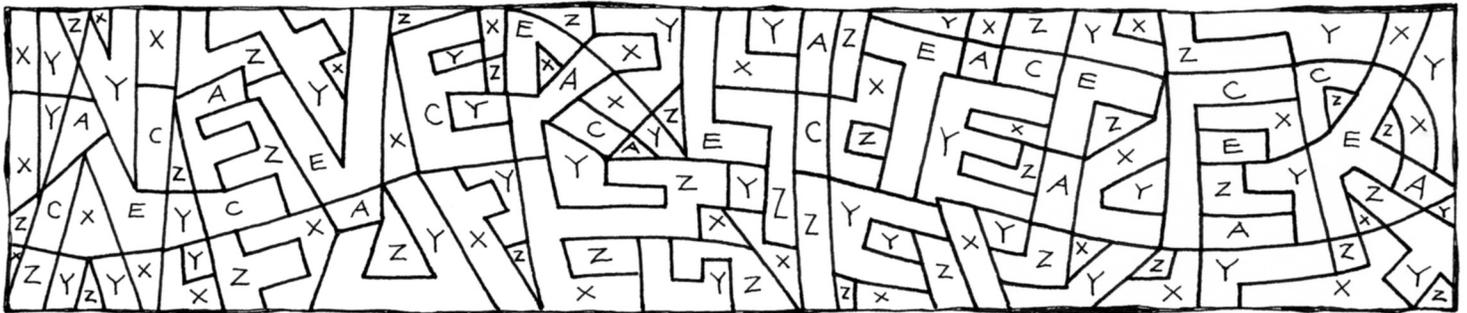
Circle the things you might bring with you for a day in the ACE Basin.



Respect the Environment

It is important that we all play a part in preserving our environment.

Color in all the areas with an A, C, or E to read a reminder for what you can do to help.



List some things you can do every day to respect the environment in which you live.

Estuaries Nationwide

There are 27 estuarine reserves throughout the United States.

As a partnership between NOAA and coastal states, these protected areas provide research and educational programs of relevance to its local and regional communities.

In this puzzle, place words that are associated with estuaries. All the words are in this activity book. One word is in place as an example.



Glossary

ACE Basin - A coastal region of South Carolina named after the three rivers (Ashepoo, Combahee, and Edisto) that meet to form it.

Artifacts - Handmade tools or ornaments made by a particular individual or culture.

Barrier Island - Important in protecting estuaries from waves and erosion, and providing habitat for many animals.

Blackwater - A deep, slow-moving channel that flows through forested swamps and wetlands. The color results from decaying leaves which have fallen into the water.

Brackish Water - Water that is a mixture of salt water and fresh water.

Consumers - An organism in the food chain that eats other organisms or plants.

Decomposers - Those organisms that break down dead organic material.

Diverse - Differing from one another.

Ecosystem - A system of interactions between living organisms and their non-living environment.

Endangered - Animal species that are very low in number and are almost extinct.

Estuary - Bodies of water and the coastal habitats that surround them; diverse habitats where the rivers meet the sea.

Gullah - An English dialect, with customs and traditions. Practiced by descendants of African slaves, who still inhabit coastal regions of South Carolina.

Habitat - A place or site where a plant or animal naturally lives and grows.

Maritime Forest - A coastal woodland comprised of trees and shrubs that are generally adapted to tolerate salt spray and moist soils.

Producers - Organic matter which provides energy and nutrition for consumers within an ecosystem..

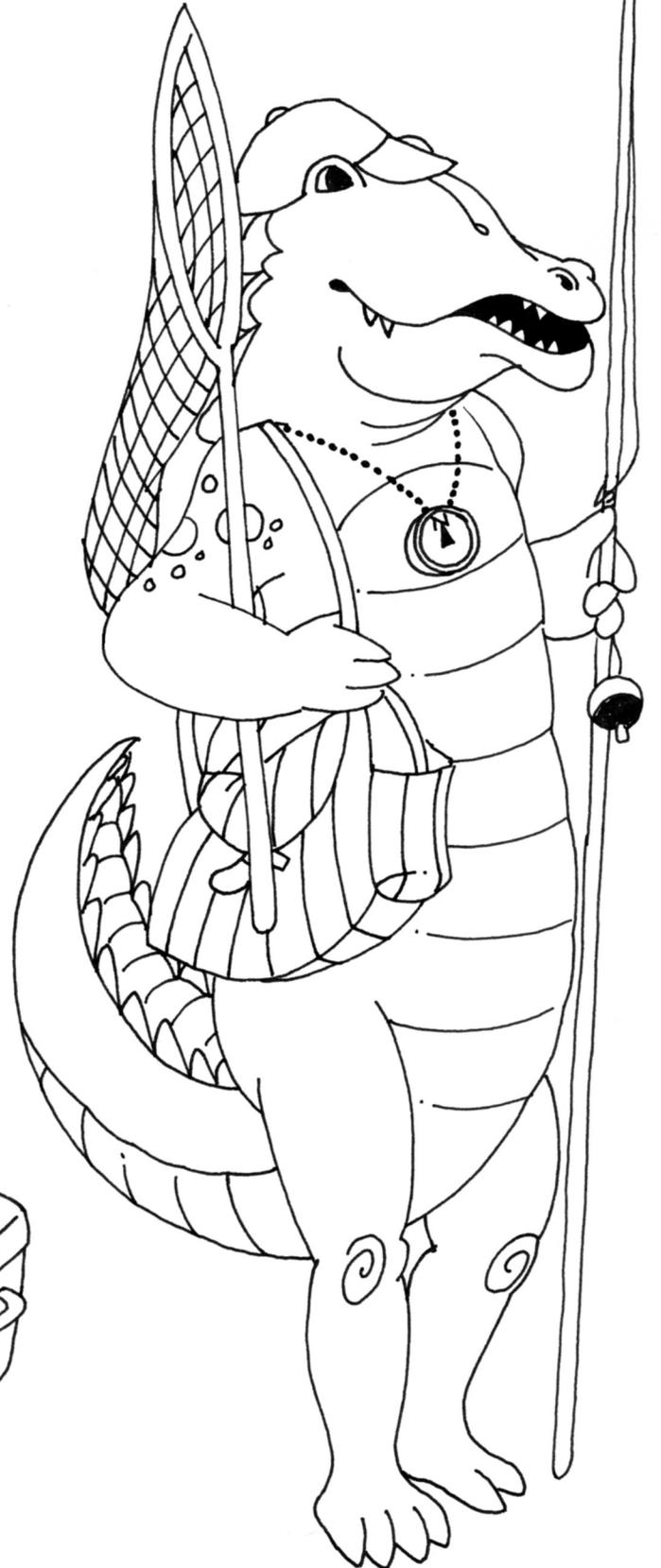
Salt Marsh - An area of low coastal grasslands which are at times covered by high tides.

Spartina - The dominant (most abundant) plant in the salt marsh. It is very tolerant of salt and is important in the food web of the salt marsh.

Venomous - Having the ability to produce a poison (as in some snakes).

What's Up?

ACE has packed for a day of fishing.
Find the differences between
these two pictures.





The ACE Basin NERR Education Program

The Reserve offers a variety of educational programs to K-12 students and teachers. These programs range from classroom lectures to hands-on field experiences to professional teacher development opportunities. Programs are conducted at the Edisto Interpretive Center on Edisto Island, and at the Michael D. McKenzie Field Station at Bennett's Point. Reserve staff also provide regularly scheduled public programs and educational cruises, and they are always eager to partner with schools, community-based organizations and volunteers.



For additional information on teacher development, ACE education programs (K-12), and self-guided educational experiences contact:

Louie Heyward / Education Coordinator

Phone: 843-953-9156 / Fax: 843-953-9159 / Email: heywardl@dnr.sc.gov

Website: <http://www.dnr.sc.gov/marine/NERR/education.html>

Programs of the ACE NERR are made possible through a partnership between the South Carolina Department of Natural Resources and the National Oceanic and Atmospheric Administration. Financial support for this publication was provided by a grant under the Federal Coastal Zone Management Act, administered by the Office of Ocean and Coastal Resource Management, NOAA, Silver Spring, MD. Copies of this publication are available at the South Carolina Department of Natural Resources, 217 Fort Johnson Road, P.O. Box 12559, Charleston, SC 29422-2559.

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